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⚠ WARNING The sling chain should not be installed, operated or maintained by any person who has not read and understood all the contents of this document. Failure to read and comply with the contents of this document can result in serious bodily injury or death, and/or property damage.

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1.0 Important Information and Warnings

1.1 Terms and Summary

This manual provides important information for personnel involved with the use and maintenance of this product. Although you may be familiar with these or similar sling chain, it is strongly recommended that you read this manual before operating or maintaining the product.

Danger, Warning, Caution and Notice – Throughout this manual there are steps and procedures that can present hazardous situations. The following signal words are used to identify the degree or level of hazard seriousness.

- ⚠ DANGER** Danger indicates an imminently hazardous situation which, if not avoided, **will** result in **death or serious injury**, and property damage.
- ⚠ WARNING** Warning indicates an imminently hazardous situation which, if not avoided, **could** result in **death or serious injury**, and property damage.
- ⚠ CAUTION** Caution indicates a potentially hazardous situation which, if not avoided, **may** result **minor or moderate injury** or property damage.
- NOTICE** Notice is used to notify people of installation, operation, or maintenance information which is important but not directly hazard-related.

⚠ CAUTION

These general instructions deal with the normal operation and maintenance situations encountered with the sling described herein. The instructions should not be interpreted to anticipate every possible contingency or to anticipate the final system, crane, or configuration that uses these slings. For systems using the slings covered by this manual, the supplier and owner of the slings are responsible for their compliance with all applicable industry standards, and with all applicable federal, state, and local regulations/codes.

⚠ WARNING

The sling described herein is not designed for and **MUST NOT** be used for lifting, supporting, or transporting people or for lifting or supporting loads over people.

The sling described herein should not be used in conjunction with other equipment unless necessary and/or required safety devices applicable to the system, crane, or application are installed by the system designer, system manufacturer, crane manufacturer, installer, or user.

Modifications to upgrade, rerate, or otherwise alter the sling shall be authorized only by the original equipment manufacturer.

Refer to ANSI/ASME B30.9, "Safety Standard for Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices" and where applicable, ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and ANSI/ASME B30.21, "Safety Standard for Manually Lever Operated Hoists".

Slings used to handle hot molten material may require additional equipment or devices. Refer to ANSI Z241.2, "Safety Requirements for Melting and Pouring of Metals in the Metalcasting Industry".

Failure to read and comply with any one of the limitations noted herein can result in serious bodily injury or death, and/or property damage.

NOTICE

It is the responsibility of the owner/user to install, inspect, test, maintain, and use the sling in accordance with ANSI/ASME B30.9, "Safety Standards for Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices" and OSHA Regulation 1910.184. If the sling is installed as part of a total lifting system, such as an overhead hoist, crane or monorail, it is also the responsibility of the owner/user to comply with the applicable ANSI/ASME B30 volume that addresses that type of equipment.

It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and use the sling read the contents of this document and applicable portions of ANSI/ASME B30.9, "Safety Standards for Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices", where applicable, ANSI/ASME B30.16, "Safety Standards for Overhead Hoists (Underhung)", ANSI/ASME B30.21, "Safety Standard for Manually Lever Operated Hoists" and OSHA Regulation 1910.184.

If the sling owner/user requires additional information, or if any information in this document is not clear, contact Harrington Hoists, Inc. or the distributor of the sling. Do not install, inspect, test, maintain, or use the sling unless this information is fully understood.

A regular schedule of inspection of the sling in accordance with the requirements of ANSI/ASME B30.9, ANSI/ASME B30.20 and where applicable, ANSI/ASME B30.16 and ANSI/ASME B30.2 should be established and records maintained.

2.0 Technical Information

2.1 Specifications

2.1.1 Operating Conditions and Environment:

Temperature: Refer to table 2-1 for the effect of temperature conditions on proper use of the sling chain.

Table 2-1 Temperature Conditions			
Temperature		Reduction of Working Load Limit	
°F	°C	While at Temperature	After Exposure to Temperature
-40 to 400	-40 to 204	None	None
400	204	15%	None
500	260	25%	5%
600	316	30%	15%
700	371	40%	20%
800	427	50%	25%
900	482	60%	30%
1000	538	70%	35%

Humidity: 100% or less. This chain is not intended for underwater use.

Corrosive, acidic, or alkaline environments: DO NOT USE in environments that are alkaline, acidic or corrosive. Damaging effects are dependent upon chemical type, concentration, temperature and length of exposure. It is the responsibility of the owner/user to identify and eliminate or avoid such environments. If required, contact Harrington Hoists, Inc. for guidance.

Dynamic Loading: REDUCE LOAD to 80% of working load limit (WLL) when loading conditions are at/near WLL, or if the sling chain is subject to vibration, or if the sling chain is used in a demanding application such as an automated production line. ALWAYS consider the effects of dynamic or accelerated loads when selecting or sizing sling chain.

2.1.2 Applicable Specifications:

ASME B30.9, "Slings"

NACM, "Welded Steel Chain Specifications"

ASTM A 973/A 973M-01, "Standard Specification for Grade 100 Alloy Steel Chain"

OSHA 1910.184, "Slings"

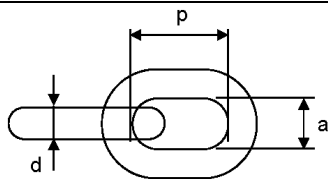
2.1.3 Sling Chain Grade: 100

2.1.4 Sling Chain Design Factor: 4, minimum

2.1.5 Sling Chain Finish: Phosphated, slightly oiled

2.1.6 Sling Chain Dimensions:

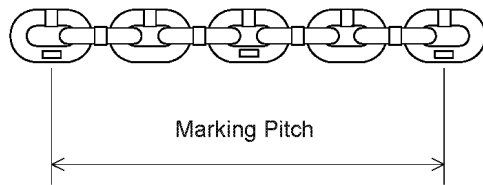
Table 2-2 Sling Chain Dimensions



Product Code	Nominal Ød in (mm)	p (pitch) in/mm	a (Minimum Inside Width) in (mm)	WLL* (Working Load Limit) lb (kg)	MBF (Minimum Breaking Force) lbs (kN)	Weight lbs/foot (kg/m)
HSC070	9/32 (7)	0.83 (21)	0.38 (9.6)	4,300 (1,950)	17,310 (77)	0.73 (1.09)
HSC100	3/8 (10)	1.18 (30)	0.51 (13.0)	8,800 (4,000)	35,969 (160)	1.50 (2.23)
HSC130	1/2 (13)	1.54 (39)	0.69 (17.5)	15,000 (6,800)	60,248 (268)	2.54 (3.78)

*Or Rated Load

2.1.7 Sling Chain Identification:

Table 2-3 Sling Chain Identification					
First marking		Second marking		First marking	
					
Nominal Diameter		inch	9/32	3/8	1/2
		mm	7	10	13
First Marking	Lot Number	Front	4 digits	4 digits	4 digits
	Manufacturer	Back	KITO	KITO	KITO
Second Marking	Chain Grade	Front	IN10	IN10	IN10
	Country of Origin	Back	JAPAN	JAPAN	JAPAN
Marking Pitch (Links)			20	16	12

3.0 Preoperational Procedures

3.1 Preoperational Checks and Trial Operations

- 3.1.1 **⚠ WARNING** Confirm the adequacy of the working load limit/rated capacity for the sling chain(s) and all other components of the lifting system before use. Inspect all load suspension members for damage prior to use and replace or repair all damaged parts.
- 3.1.2 Record the sling identification information per paragraph 2.1.7 Sling Chain Identification and ANSI/ASME B30.9, "Slings".
- 3.1.3 Ensure that new and repaired slings have been proof tested by the sling chain manufacturer or a qualified person.
- 3.1.4 Confirm proper use:
- Before using sling chain read and become familiar with Section 4 – Operation/Use.
 - Before using ensure that the sling chain meets the requirements of ANSI/ASME B30.9, "Safety Standard for Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices" and where applicable, ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and ANSI/ASME B30.21, "Safety Standard for Manually Lever Operated Hoists".
 - Before operating ensure that nothing will interfere with the full range of the lifting system's operation.

4.0 Operation/Use

4.1 Introduction

⚠ DANGER

Do **Not** Walk Under a Suspended Load

⚠ WARNING

Operators for lifting systems involving a sling chain shall be required to read the operation section of this manual, the warning contained in this manual, instruction and warning labels on the sling chain or lifting system, and operation sections of ANSI/ASME B30.9, "Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices" and where applicable, ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and ANSI/ASME B30.21, "Safety Standard for Manually Lever Operated Hoists". The operator shall also be required to be familiar with the hoist and hoist controls before being authorized to operate the sling chain or lifting system.

Sling chain users should be trained in proper rigging procedures for the attachment of the sling chain to the loads.

Sling chain users should be trained to be aware of potential malfunctions of the equipment that require adjustment or repair, and to be instructed to stop operation if such malfunctions occur, and to immediately advise their supervisor so corrective action can be taken.

Sling chain users should have normal depth perception, field of vision, reaction time, manual dexterity, and coordination.

Sling chain users should **not** have a history of or be prone to seizures, loss of physical control, physical defects, or emotional instability that could result in actions of the operator being a hazard to the operator or to others.

Sling chain users should **not** use a sling chain or operate lifting system when under the influence of alcohol, drugs, or medication.

Sling chain is intended only for vertical lifting service or freely suspended unguided loads. Do **not** use sling chain for loads that are not lifted vertically, loads that are not freely suspended, or loads that are guided.

NOTICE

- Read ANSI/ASME B30.9, "Slings", ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices" and where applicable, ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and ANSI/ASME B30.21, "Safety Standard for Manually Lever Operated Hoists".
- Read the sling manufacturer's Operating and Maintenance Instructions.
- Read all labels attached to equipment.
- Do **not** use a sling chain before reading this document.

The sling can be used as a below-the-hook lifting device or an above-the-hoist suspending device. Per the ANSI/ASME B30 standards, the use of a sling is subject to certain hazards that cannot be mitigated by engineered features, but only by the exercise of intelligence, care, common sense, and experience in anticipating the effects and results of utilizing the sling. Use this guidance in conjunction with other warnings, cautions, and notices in this manual to govern the operation and use of the sling.

4.2 Shall's and Shall Not's for Operation

⚠ WARNING

Improper use of a sling can create a potentially hazardous situation which, if not avoided, could result in death or serious injury, and substantial property damage. To avoid such a potentially hazardous situation **THE OPERATOR SHALL:**

- **NOT** shorten or adjust the sling chain by any means other than those methods approved by the sling chain manufacturer or qualified person.
- **NOT** shorten or lengthen the sling chain by knotting or twisting.
- Hitch the sling chain in a manner providing control of the load.
- **NOT** allow the sling chain in contact with edges, corners or protrusions without being protected by a material of sufficient strength, thickness, and construction to prevent damage to the sling chain.
- **NOT** allow the sling chain to be shock loaded.
- **NOT** allow loads to be rested on the sling chain.
- **NOT** pull sling chains from under a load when the load is resting on the sling chain.
- Be alert during lifting, with or without load, for possible sling chain snagging on objects.
- **NOT** allow the sling chain to be twisted or kinked.
- **NOT** allow the sling chain to be dragged on the floor or over an abrasive surface.
- **NOT** allow the sling chain to be constricted, bunched, or pinched by the load, hook, or any fitting.
- Reduce the working load limit (rated capacity) of sling chains exposed to high temperatures per Section 2.1.1.
- Make sure sling chains, fittings and attachments are properly sized and rigged.
- Make sure load is balanced and load-holding action is secure before continuing.
- Make sure all persons stay clear of the supported load.
- Warn personnel before lifting or moving a load.
- Warn personnel of an approaching load.

⚠ CAUTION

Improper operation of a sling can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage. To avoid such a potentially hazardous situation **THE OPERATOR SHALL:**

- Keep all portions of the human body from between the sling chain and the load, and from between the sling chain and the crane hook or hoist hook.
- **NOT** allow personnel to stand in line with or next to the leg(s) of a sling chain that is under tension.
- **NOT** allow personnel to stand or pass under a suspended load.
- **NOT** allow personnel to ride on the sling chain.
- Inspect the sling regularly and keep appropriate records of maintenance.
- Avoid swinging the load.
- **NOT** allow your attention to be diverted from using the sling chain or lifting system.
- **NOT** allow the sling chain to be subjected to sharp contact with structures, or objects through misuse.

5.0 Inspection

5.1 Initial Inspection – Prior to initial use, all new, altered, or modified slings shall be inspected by a designated person to ensure compliance with the applicable provisions of this manual.

5.2 Inspection Classification – The inspection procedure herein is based on ANSI/ASME B30.9, "Slings". Inspections for sling chains in regular service are divided into FREQUENT and PERIODIC groups based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the degree of service and usage the slings are subjected to. FREQUENT and PERIODIC inspections should be made with respective intervals between inspections as defined in Table 5-1, "Inspection Intervals".

Table 5-1 Inspection Intervals		
Service	FREQUENT Inspection	PERIODIC Inspection
Normal Service	Each Day or Shift	Yearly
Severe Service		Monthly to Quarterly
Special Service		As recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.

5.3 Frequent Inspection

- 5.3.1 Inspections should be made on a FREQUENT basis in accordance with Table 5-2, "Removal Criteria" Included in these FREQUENT Inspections are observations made during each day or shift the sling chain is in use for any defects or damage that might appear between Periodic Inspections. Evaluation and resolution of the results of FREQUENT Inspections shall be made by a designated person such that the sling chain is maintained in safe working condition.

5.4 Periodic Inspection

- 5.4.1 Inspections should be made on a PERIODIC basis in accordance with Table 5-2, "Removal Criteria." Evaluation and resolution of the results of PERIODIC Inspections shall be made by a designated person such that the sling is maintained in safe working condition.
- 5.4.2 A complete inspection for damage of the sling chain shall be periodically performed by a designated person. Each link shall be examined individually, taking care to expose and examine all surfaces including the inner link surfaces. The sling chain shall be examined for conditions such as those listed in Table 5-2, "Removal Criteria" and a determination made as to whether they constitute a hazard. Periodic inspection intervals shall not exceed 1 year. The frequency of periodic inspections should be based

on Table 5-1, "Inspection Intervals". A written record of the most recent periodic inspection shall be maintained and shall include the condition of the sling chain.

5.5 Removal Criteria

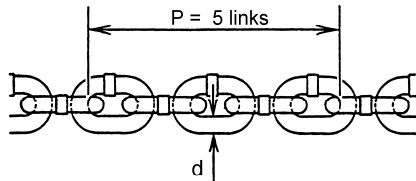
5.5.1 An alloy sling chain shall be removed from service if conditions such as listed in Table 5-2, "Removal Criteria".

Table 5-2 Removal Criteria
Missing or illegible sling chain identification.
Cracks, breaks, excessive wear, nicks or gouges, excessive pitting or corrosion or weld splatter.
Minimum thickness on chain links shall not be below the "d" values listed in Table 5-4, "Chain Wear Dimensions". Stretched sling chain links shall not exceed the "P" values listed in Table 5-4, "Chain Wear Dimensions".
Bent, twisted or deformed chain links.
Lack of ability of chain to hinge (articulate) freely.
Evidence of heat damage

5.6 Repair

5.6.1 Sling chains shall be repaired as follows in Table 5-3, "Repair".

Table 5-3 Repair
Sling chain shall be repaired only by the sling manufacturer or qualified person.
A repaired sling shall be marked to identify the repairing agency.
Sling chain used for sling repair shall comply with the provisions of ANSI/ASME B30.9, "Slings".
Cracked, broken or bent chain links shall not be repaired, they shall be replaced.
Modifications or alterations to the sling shall be considered as repairs and shall conform to all other provisions of ANSI/ASME B30.9, "Slings".
Hooks, rigging hardware and below-the-hook lifting devices per the manufacturer's criteria, ANSI/ASME B30.10, Hooks, B30.20, Below-the-Hook Lifting Devices and B30.26, Rigging Hardware.
All repairs shall comply with the proof test requirements of ANSI/ASME B30.9, "Slings".

Table 5-4 Chain Wear Dimensions				
				
Product Code	"P" Dimension inch (mm)		"d" Dimension inch (mm)	
	Standard	Discard	Standard	Discard
HSC070	4.17 (106.0)	4.38 (111.3)	0.28 (7.0)	0.25 (6.3)
HSC100	5.96 (151.5)	6.26 (159.0)	0.39 (10.0)	0.35 (9.0)
HSC130	7.76 (197.0)	8.14 (206.8)	0.51 (13.0)	0.46 (11.7)

6.0 Maintenance and Handling

6.1 For sling chain maintenance or storage, comply with the following points.

6.1.1 **CAUTION**

- Avoid storage or use in temperatures at or below -40°F (-40°C) and at or above 400°F (205°C).
- Possibility of corrosion increases for installations where salt air and high humidity are present. Make frequent and regular inspections of the sling chain's condition and operation.
- Avoid exposure to chemically active environments and chemicals in the form of solids, liquids, gases, vapors or fumes.
- Do not store in a manner that would allow mechanical damage or kinking.
- Do not store the sling chain while supporting a load.
- Remove any dirt or water on the sling chain.
- Store the sling chain in a dry and clean area.
- Perform all inspections given in "5.0 Inspection" if irregularity of the sling chain is found after operation.

7.0 Warranty

All products sold by Harrington Hoists, Inc. are warranted to be free from defects in material and workmanship from date of shipment by Harrington for the following periods:

Manual Hoists, Trolleys, & Beam Clamps – 2 years
NER2/ER2 Hoists Enhanced Features Models – 3 Years
(N)ER030L(D), All Other Electric and Air Hoists, Trolleys, Crane Components – 1 year
Sling Chain, Spare / Replacement Parts – 1 year
NER2/ER2 “The Guardian” Smart Brake – 10 years

The product must be used in accordance with manufacturer's recommendations and must not have been subject to abuse, lack of maintenance, misuse, negligence, or unauthorized repairs or alterations.

Should any defect in material or workmanship occur during the above time period in any product, as determined by Harrington Hoist's inspection of the product, Harrington Hoists, Inc. agrees, at its discretion, either to replace (not including installation) or repair the part or product free of charge and deliver said item F.O.B. Harrington Hoists, Inc. place of business to customer.

Customer must obtain a Return Goods Authorization as directed by Harrington or Harrington's published repair center prior to shipping product for warranty evaluation. An explanation of the complaint must accompany the product. Product must be returned freight prepaid. Upon repair, the product will be covered for the remainder of the original warranty period. Replacement parts installed after the original warranty period will only be eligible for replacement (not including installation) for a period of one year from the installation date. If it is determined there is no defect, or that the defect resulted from causes not within the scope of Harrington's warranty, the customer will be responsible for the costs of returning the product.

Harrington Hoists, Inc. disclaims any and all other warranties of any kind expressed or implied as to the product's merchantability or fitness for a particular application. Harrington will not be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damages, loss or expense arising in connection with the use or inability whatever, regardless of whether damage, loss or expense results from any act or failure to act by Harrington, whether negligent or willful, or from any other reason.

8.0 Inspection Certificate Samples

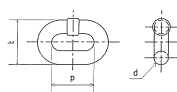
HSC070 INSPECTION CERTIFICATE SAMPLE

Certificate No. : FK120/13
 Date Issued : 1/1/31

INSPECTION CERTIFICATE

Messrs. Harrington Hoists INC.

Commodity : Link Chain
 Code : SY2-070
 Lot No. : 0124
 Quantity : 1 line(s)
 Our reference No. : U2-071-02206
 Order No. : 37209(1ST) C/No.44



1. Material : Nickel Alloy Steel

2. Dimensions (mm)

	d	p	b
Specified	7.0 +0.14 -0.21	21.0 +0.60 0	Max. 24.5
Result	Good	Good	Good

3. Breaking test

	Breaking load (kN)	Total ultimate elongation (%)
Specified	Min. 77	Min. 20
Result	Good	Good

4. Manufacturing Proof force test (Test load : 48 kN)

	Permanent elongation (%)
Specified	Max. 0.5
Result	Good

General judgment : Satisfactory

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Quality Assurance Group
Quality Assurance Department
 (Manager)

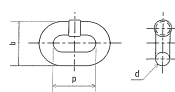
HSC100 INSPECTION CERTIFICATE SAMPLE

Certificate No. : FK120/13
 Date Issued : 1/1/31

INSPECTION CERTIFICATE

Messrs. Harrington Hoists INC.

Commodity : Link Chain
 Code : SY2-100
 Lot No. : 0127
 Quantity : 1 line(s)
 Our reference No. : U2-071-02206
 Order No. : 37209(1ST) C/No.11



1. Material : Nickel Alloy Steel

2. Dimensions (mm)

	d	p	b
Specified	10.0 +0.20 -0.30	30.0 +0.80 0	Max. 35.0
Result	Good	Good	Good

3. Breaking test

	Breaking load (kN)	Total ultimate elongation (%)
Specified	Min. 160	Min. 20
Result	Good	Good

4. Manufacturing Proof force test (Test load : 100 kN)

	Permanent elongation (%)
Specified	Max. 0.5
Result	Good

General judgment : Satisfactory

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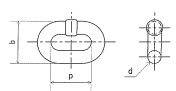
HSC130 INSPECTION CERTIFICATE SAMPLE

Certificate No. : FK120/13
 Date Issued : 1/1/31

INSPECTION CERTIFICATE

Messrs. Harrington Hoists INC.

Commodity : Link Chain
 Code : SY2-130
 Lot No. : 0122
 Quantity : 1 line(s)
 Our reference No. : U2-071-02206
 Order No. : 37209(1ST) C/No.1



1. Material : Nickel Alloy Steel

2. Dimensions (mm)

	d	p	b
Specified	13.0 +0.26 -0.30	39.0 +1.20 0	Max. 45.5
Result	Good	Good	Good

3. Breaking test

	Breaking load (kN)	Total ultimate elongation (%)
Specified	Min. 260	Min. 20
Result	Good	Good

4. Manufacturing Proof force test (Test load : 166 kN)

	Permanent elongation (%)
Specified	Max. 0.5
Result	Good

General judgment : Satisfactory

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